

perature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

#### CAUTIONARY SIGNALS FOR MARCH, 1889.

Statement showing percentages of justifications of wind signals and cold-wave signals for the month of March, 1889:

**Wind signals.**—(Ordered by Assistant Prof. H. A. Hazen.) Total number of signals ordered, one hundred and five; justified as to velocity, wholly, seventy-one, partly, eight; justified as to direction, ninety-seven. Of the signals ordered, sixty-six were cautionary, of which forty-two were wholly, and four partly justified. Number of storm signals ordered, thirty-nine; justified, wholly, twenty-nine, partly, four. Number of signals ordered for easterly winds, sixty-two; justified, fifty-four. Number of signals ordered for westerly winds, forty-three; justified, forty-three. Number of signals ordered late, nine. Number of winds without signals, twenty-five. Percentage of justifications, 69.7.

**Cold-wave signals.**—(Ordered by Assistant Prof. T. Russell.) Total number of signals ordered, one hundred and thirty-three, of which forty-three were wholly, and nine partly justified. Five signals were ordered late. Number of severe cold-waves without signals, nineteen. Percentage of justifications, 43.8.

*Percentages of local verifications of weather and temperature signals as reported by directors of the various State Weather Services for March, 1889.*

| States.                   | Weather. | Temperature. | States.             | Weather. | Temperature. |
|---------------------------|----------|--------------|---------------------|----------|--------------|
| Illinois.....             | 83.7     | 76.8         | Nebraska.....       | 85.3     | 86.1         |
| Indiana.....              | 81.7     | 77.6         | New Jersey.....     | 76.0     | 92.7         |
| Kansas.....               | 89.2     | 89.3         | New York.....       | 72.0     | 80.0         |
| Kentucky.....             | 83.0     | 78.0         | North Carolina..... | 83.0     | 80.1         |
| Louisiana (northern)..... | 96.0     | 81.0         | Ohio.....           | 83.0     | 82.0         |
| Louisiana (southern)..... | 96.0     | 83.0         | South Carolina..... | 87.0     | 89.0         |
| Michigan.....             | 78.7     | 80.9         | Tennessee.....      | 93.0     | 85.5         |
| Minnesota.....            | 83.0     | 76.0         |                     |          |              |

#### STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts are republished from reports for March, 1889, of the directors of the various state weather services:

##### ALABAMA.

The month has been very dry and the average precipitation was 2.24 below the normal. This deficiency of rain has injuriously affected the grain crop and has rendered the land so dry that it has been difficult to properly prepare it for cotton planting. The average temperature was also below the normal, 1.6.

The month closed with a decidedly better change in the weather, and farmers are rapidly preparing the land for cotton seed and the growing grain.

##### SUMMARY.

**Temperature.**—Monthly mean, 53.8; highest monthly mean, 59.3, at Tuscaloosa; lowest monthly mean, 48, at Valley Head; maximum, 85, at Tusculumbia, 16th; minimum, 20, at Valley Head, 10th; range for state, 65; greatest local monthly range, 60, at Valley Head; least local monthly range, 29.7, at New Market.

**Precipitation.**—Average for the state, 2.92; greatest, 4.22, at Motes; least, 1.52, at Greensborough.

**Wind.**—Prevailing direction, northwest.—*P. H. Mell, Signal Corps, Auburn, director.*

##### ARKANSAS.

##### SUMMARY.

**Temperature.**—Monthly mean, 52.9; highest monthly mean, 56.3 at Lonoke; lowest monthly mean, 49.8, at Alexandria and Ozone; maximum, 84, at Lead Hill, 29th; minimum, 22, at Lead Hill, 9th; range for state, 62; greatest local monthly range, 62, at Lead Hill; least local monthly range, 28, at Dallas.

**Precipitation.**—Average for the state, 5.11; greatest, 8.28, at Heber; least, 0.30, at Helena.—*Prof. John C. Branner, Little Rock, director; W. U. Simons, Sergeant, Signal Corps, assistant.*

##### COLORADO.

##### SUMMARY.

**Temperature.**—Monthly mean, 36.1; highest monthly mean, 46.4, at Cañon City; lowest monthly mean, 18.2, at Alma; maximum, 72, at Longmont, 28th; minimum, -3.0, at Breckenridge, 23d; range for state, 75; greatest local monthly range, 38.7, at Breckenridge; least local monthly range, 16.1, at Dolly Varden Mine.

**Precipitation.**—Average for the state, 0.56; greatest, 1.80, at Burlington; least, trace, at Saguache.—*Prof. F. H. Loud, Colorado Springs, director; T. W. Sherwood, Corporal, Signal Corps, assistant.*

##### ILLINOIS.

##### SUMMARY.

**Temperature.**—Monthly mean, 41.9; highest monthly mean, 49.3, at Fairfield; lowest monthly mean, 25.3, at Lake Forest; maximum, 78, at Pontiac and Sterling, 15th; at Flora 16th, and at Golconda, 19th; minimum, 10, at Dwight, 28th; range for state, 68; greatest local monthly range, 64, at Pontiac; least local monthly range, 42, at Mascoutah.

**Precipitation.**—Average for the state, 1.63; greatest, 4.34, at Atwood; least, 0.70, at Vandalia and Mount Morris.

**Wind.**—prevailing direction, northwest.—*John Craig, Sergeant, Signal Corps, Springfield, in charge.*

##### INDIANA.

The mean temperature for March was greatly in excess of the normal, the departures at different stations ranging from 0.2 to 6.2. The average departure for the state is probably 2.8. The highest temperature occurred at most stations from the 16th to the 17th, and was only slightly below the maxi-

mum temperature noted in former years. The lowest temperature was noted on the 9th and 11th, at most stations, and at a few stations on the 30th, the minimum temperature not being very low and far above the average minimum for many years.

The precipitation during the month was everywhere below the normal, the departures ranging from 0.14 to 3.20, the average deficiency being nearly 1.31. The least precipitation fell in the southern portion, and the greatest in the northern. The heaviest rainfall occurred at most stations on the 31st. Snow fell only on a few days and in small quantities.

##### SUMMARY.

**Temperature.**—Monthly mean, 41.3; highest monthly mean, 46.5, at Princeton; lowest monthly mean, 36.6, at Columbia City; maximum, 81.0, at Marengo, 17th; minimum, 14.0, at Delphi and Angola, 30th; range for state, 67.0; greatest local monthly range, 56.0, at Marengo and Vevay; least local monthly range, 43.0, at Seymour, Franklin, and Columbia City.

**Precipitation.**—Average for the state, 1.51; greatest, 2.46, at Columbia City; least, 0.80, at Huntingburgh.

**Wind.**—Prevailing direction, northwest.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.*

##### IOWA.

The month was extraordinarily warm, dry, and fine, northwesterly winds and calm prevailing. The mean temperature was 8.3 above the normal. Since 1860, March has twice been as warm, in 1860 and 1868, and once warmer, in 1878. The middle decade of the month was the warmest, it being 13 above the normal; the first and last decades exceeded the normal by only half that amount. The warmest days of the month were the 14th and 15th, exceeding the normal by 20; on four days only was the temperature slightly below the normal, and it did not fall below 20 at the central station.

The total rainfall throughout the state was exceedingly small; in the central portion of the state no measurable amount of precipitation fell; in the western, eastern, and southern portions the total precipitation averaged about 0.25, and in the extreme southeast and skirting the Mississippi from Keokuk to Clinton the rainfall reached and slightly exceeded 1.00. The light thunder showers of the 15th and 30th brought nearly all the rain that fell during the month; the first occurred mainly in the northwest, and the latter with hail, in the southeast.—*Dr. Gustavus Hinrichs, Iowa City, director.*

##### KANSAS.

The month has been an unusual one in many respects; seldom has the state experienced a warmer and wetter March, and the absence of the usual March gales has been conspicuous. The close of the month finds the pastures turning green, the winter wheat in a most excellent condition, oats in part sown, plowing for corn in progress, with some planted, and the season generally ten days in advance. The temperature is from 1 to 5 above the normal, the least excess being in the southeastern counties and the greatest in the northeastern.

There is an excess of precipitation except in the extreme northeastern and southwestern counties. The greatest excess extends from the southeastern counties northwestward passing out of the state through Republic, Jewell, and Smith counties. The largest excess and greatest precipitation in any one county occurs in Geary; another heavy excess occurs in the northwestern part of Logan. The deficiency is quite marked in the northeastern counties, where it amounts to 1.00. A peculiar local deficiency appears in the northern portion of Barton, eastern part of Ellis, and greater part of Russell.

##### SUMMARY.

**Temperature.**—Monthly mean, 43.0; highest monthly mean, 49.5, at Rome;

lowest monthly mean, 34.8, at Gibson; maximum, 86, at Russell, 6th; minimum, 10, at Cunningham, 10th; range for state, 76; greatest local monthly range, 72, at Russell; least local monthly range, 41, at Kanopolis; greatest daily range, 50, at Russell, 6th; least daily range, 2, at Manhattan, 15th.

*Precipitation.*—Average for the state, 1.69; greatest, 4.16, at Junction City; least, 0.30, at Victoria.

*Wind.*—Prevailing direction, north.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

#### KENTUCKY.

##### SUMMARY.

*Temperature.*—The average for the state, as determined from the tri-daily observations, was 46.6; from the mean of the average maximum and minimum, 46; these figures indicate an excess of about 2.0 above the normal; average maximum for the state, 57.2; average minimum, 36.9; maximum, 82, at Bowling Green, 13th; minimum, 18, at Ashland, 11th; average monthly range, 51.4; greatest local monthly range, 60, at Bowling Green; least, 44, at Millersburg; the warmest days of the month were the 17th, 18th, and 31st, and the coldest the 9th and 11th.

*Precipitation.*—The average precipitation for the state, 1.52, is about 2.50 less than the normal; greatest, 2.98, at Richmond; least, 0.43, at South Fork. Snow fell to the depth of 1.0 in the eastern and northern portions of the state. There was less than the usual amount of frost during the month, and but little damage to crops resulted from it. The number of clear and fair days was largely in excess of the average.—*Dr. E. A. Grant, Louisville, director; Frank Burke, Sergeant, Signal Corps, assistant.*

#### LOUISIANA.

There was a deficiency of 1.5 in the mean temperature of the month as compared with the March normal of past twenty years. The coolest portion of the month was from the 10th to 12th, and the warmest about the 16th, 29–30th. There was a greater average percentage of sunshine than in March, 1888, fewer rainy days, and about two inches less rainfall.

##### SUMMARY.

*Temperature.*—Monthly mean, 58.2; highest monthly mean, 61.9, at Cameron; lowest monthly mean, 36.0, at North Louisiana Experimental Station; maximum, 88, at Minden, 29th; minimum, 22, at North Louisiana Experimental Station, 11th; range for state, 66; greatest local monthly range, 58, at North Louisiana Experimental Station; least, 26, at Shell Beach; mean daily range, 21.7.

*Precipitation.*—Average for the state, 3.68; for the northern section, 3.69; and for the southern section, 3.68; greatest local monthly rainfall, 7.02, at Vicksburg, Miss.; least monthly rainfall, 1.34, at Marks; greatest daily rainfall, 2.79, at Plaquemine, 22–23d.

*Wind.*—Prevailing direction, north.—*R. E. Kerkam, Sergeant, Signal Corps, New Orleans, in charge.*

#### MICHIGAN.

The month has been remarkable for the warm and pleasant weather which has prevailed, the many clear days, and the great deficiency in precipitation, and lack of any general or severe storms. The mean temperature is 4.1 above the normal of fourteen years. The temperature was above the normal on twenty-three days, normal on one, and below the normal on seven days.

The average precipitation for the month is 1.63 below the normal of fourteen years; it was below the normal in all sections, and the greatest deficiency, 2.05, occurred in the northern, and the least, 0.61, in the southern section. The snowfall for the month was very light, and fell principally on the 29th and 31st. The average total fall of snow on the level for the state during the month was 3.9.

##### SUMMARY.

*Temperature.*—Monthly mean, 33.2; highest monthly mean, 38.4, at Marshall; lowest monthly mean, 27.2, at Gaylord; maximum, 71, at Gladwin, 17th; minimum, 2, at Gaylord, 9th; range for state, 69; greatest local monthly range, 62, at Gladwin; least local monthly range, 28, at Pulaski; greatest daily range, 50, at Gladwin, 23d; least daily range, 2, at Manistee, 29th.

*Precipitation.*—Average for the state, 0.87; greatest, 2.27, at Buchanan; least, 0.04, at Mio.

*Wind.*—Prevailing direction, northwest.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

#### MINNESOTA.

The month was much warmer than usual and there was a deficiency of more than one-third in the precipitation. As regards the season, the month was about two weeks in advance.

##### SUMMARY.

*Temperature.*—The average temperature for the state, 33.3, is nearly 10 above the normal. The maximum, 70, was recorded at Morris, 24th, and the minimum, —9, at Saint Vincent, 18th; range for state, 79. With a single exception of March, 1878, the month was the warmest March in Minnesota since the establishment of the Signal Service stations in 1871. From the southern border of the state to the latitude of Saint Paul, the month was about 7 warmer than usual; the temperature was 8.5 above the normal at Duluth, 10 at Minneapolis, 12 at Moorhead, and nearly 15 above at Saint Vincent.

*Precipitation.*—The average precipitation for the state is 0.74, or 36 per cent. less than the normal. The fall of snow and rain was in excess of the normal in that portion of the state bordering on Lake Superior; elsewhere it

was deficient. The deficiency equaled 43 per cent. in the southern half of the state and 65 per cent. in the northern part. From the 1st to 12th there was no precipitation of any consequence. Snow was quite general on the 13th and 14th, and rain on the 15th and 16th. Dry weather prevailed from the 17th to 28th. Light snow occurred on the 29th and 30th, but disappeared on the last day of the month.

*Wind.*—Prevailing direction, northwest.—*Prof. W. W. Payne, Northfield, director; John Healy, Private, Signal Corps, Saint Paul, assistant.*

#### MISSISSIPPI.

##### SUMMARY.

*Temperature.*—The average for the state, 55.8, is about 0.6, below the normal; highest monthly mean, 60.5, at Logtown; lowest monthly mean, 50.9, at Batesville; maximum, 85, at Louisville, 17th; minimum, 27, at Pontotoc, 10th. Frost occurred in the northern division on the 4th, 6th, 8th, 10th, 11th, 12th, and 29th; the last severe frost was noted on the 12th.

*Precipitation.*—The average for the state, 3.93, is 2.22 below the normal; greatest, 7.02, at Vicksburg; least, 0.70, at Kosciusko; rain fell generally throughout the state on the 1st, 2d, 3d, 17th, 23d, 24th, 25th, and in the northern portion of the state from the 28th to the 31st.

*Wind.*—Prevailing directions, north and northwest.—*R. B. Fulton, Signal Corps, University, director.*

#### MISSOURI.

##### SUMMARY.

*Temperature.*—The mean for March was 44.9. The highest temperature reported was 84, at Proteau, and the lowest, 13, at Ozark. The average of maximum temperatures was 75.5, and the average of minimum temperatures was 21.6, making an average range of 51.9. The highest temperature occurred on the 14th, 15th, 25th, 29th, and the lowest on the 9th, 10th, and 11th.

*Precipitation.*—The average precipitation was 2.04, which was 0.14 below the March normal. The greatest amount of precipitation reported was 5.92, at Springfield, and the least, 0.09, at Conception. In the state, as a whole, precipitation occurred on twenty days. The greatest number of days of precipitation in any one place was ten at Springfield.—*Prof. Francis E. Nipher, Saint Louis, director; G. A. Weber, Sergeant, Signal Corps, assistant.*

#### NEBRASKA.

##### SUMMARY.

*Temperature.*—The monthly mean, 42.1, is 6 above the normal, and is the highest mean for the month since 1878; the maximum, 78, has been exceeded four times since 1878. On about one-half of the days of the month the freezing point has been reached, but the thermometer has not fallen to zero.

*Precipitation.*—The precipitation for the month is quite variable, and has been neither very large nor very small; a narrow strip running north and south through central Nebraska has had over 2.00, and the eastern and western portions of the state received less than 1.00; the border of the above mentioned strip and the southern part of the state generally have had from 1.00 to 2.00, while the eastern and western portions have had less than 1.00, falling to a mere trace at the extreme west.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Corporal, Signal Corps, assistant.*

#### NEVADA.

##### SUMMARY.

*Temperature.*—Monthly mean, 44.1; highest monthly mean, 64.5, at El Dorado Canyon; lowest monthly mean, 31.6, at Elko; maximum, 85.1, at El Dorado Canyon; minimum, 12.0, at Elko; range for state, 73.1.

*Precipitation.*—Average for the state, 1.38; greatest, 4.45, at Genoa; least, 0.00, at Hot Springs.—*Prof. Chas. W. Friend, Carson City, director; H. F. Alciatore, Private, Signal Corps, assistant.*

#### NEW ENGLAND METEOROLOGICAL SOCIETY.

March was warm and dry. The average temperature was about 4 above the average and the precipitation about 1.25 below the average. The precipitation of the month falls into three distinct periods, viz., 3d–10th, 16th–21st, and 27th–31st. On nine days no rain or snow was recorded in New England.

The first three months of the year taken together show a deficiency of about 0.75 in precipitation, and were much warmer than the average, the excess being about 3. At the close of March the season was well advanced. But little frost remained in the ground, wild flowers had appeared, and the spring birds had returned earlier than usual.

##### SUMMARY.

*Temperature.*—Monthly mean, 35.5 (105 stations); highest monthly mean, 39.8, at Olneyville; lowest monthly mean, 28.6, at Mayfield; maximum, 72, at Lunenburg, 5th; minimum, —6, at West Milan, 1st; range for New England, 78; greatest local monthly range, 68, at West Milan; least local monthly range, 25, at Block Island; greatest daily range, 56, at West Milan, 1st; least daily range, 0.8, at Woonsocket, 5th; the average temperature of March, for 26 stations, having records for more than 10 years, is 31.4; the average for March, 1889, is 35.6—departure +4.2.

*Precipitation.*—Average for New England, 2.46 (125 stations); greatest, 5.46, at Nantucket (b); least, 0.86, at Dudley. The average precipitation for March for 33 stations, having records for more than ten years, is 3.93; the average for March, 1889, is 2.50—departure, —1.43.

*Wind.*—Prevailing direction, northeast (17 stations).—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; J. W. Smith, Sergeant, Signal Corps, assistant.*

## NEW JERSEY.

## SUMMARY.

**Temperature.**—The mean for March, 40.5, is 3.7 above the average determined from past records of forty-nine stations, and is 7.7 above the average for the corresponding month of 1888. The warmest days during the month were the 18th, 23d, and 24th, and the coldest the 1st, 10th, 11th, 12th, 25th, 26th, 29th, 30th, 31st. The lowest temperature recorded in the northern portion of the state was 19, in the central, 22, and in the southern, 28.5.

**Precipitation.**—The average precipitation for the state, 3.79, is 0.20 below the average determined from past records of forty-nine stations and is 1.92 below the average for the corresponding month of 1888. One station, Bridgeton, reports a total for the month exceeding 6.00; five stations: Egg Harbor City, Freehold, Oceanic, Tom's River, and Trenton, report a total exceeding 5.00, and four stations: Atlantic City, Imlaystown, Ocean City, and New York City, a total exceeding 4.00.

**Wind.**—Prevailing directions, northeast and northwest.—*Prof. George H. Cook, New Brunswick, director; E. W. McGann, Sergeant, Signal Corps, assistant.*

## NEW YORK.

## SUMMARY.

**Temperature.**—Mean for the state, 33.3. The temperature was above the normal at all stations, except Utica, where it was slightly below; maximum, 75, at Nineveh, 22d; minimum, —3.2, at Barnes' Corners, 9th.

**Precipitation.**—Average for the state, 1.74. The precipitation was below the average at all stations, except Humphrey and New York City, where it was 0.05 and 0.13 above, respectively, and normal at Palermo and Potsdam; average number of days on which precipitation occurred, 9.

**Wind.**—Prevailing direction, northwest.—*Prof. E. A. Fuertes, Ithaca, director; I. W. Brewer, Private, Signal Corps, assistant.*

## NORTH CAROLINA.

## SUMMARY.

**Temperature.**—Monthly mean, 47.7, highest monthly mean, 52, at Salisbury; lowest monthly mean, 43.1, at Norfolk, Va.; highest temperature, 77, at Morgantown, 17th, and at New Berne, 28th and 31st; lowest temperature, 21.2, at Asheville, 10th; greatest local monthly range, 51, at Asheville; least local monthly range, 28, at Hatteras.

**Precipitation.**—Average monthly rainfall, 3.06; greatest monthly, 7.52, at Norfolk, Va.; least monthly, 0.43, at Asheville.—*Dr. Herbert B. Battle, Raleigh, director; H. McP. Baldwin, Sergeant, Signal Corps, assistant.*

## OHIO.

## SUMMARY.

**Temperature.**—The month was remarkable for having the highest maximum, minimum, and mean temperatures on record for March since the opening of the bureau in 1883. The mean temperature of the northern section was 37.3; of the middle section, 40.9; of the southern section, 43.1. These means are 4.9, 5.4, and 4.1 above the averages for the sections, respectively. The mean for the state, 40.2, was 4.6 above the average. The mean daily range was 19.4. The greatest daily range was 53, at Athens, 30th; the least, 2, at Toledo, 2d, at Jefferson, 10th, and at Cleveland, 21st.

**Precipitation.**—Precipitation was general in all sections on the 1st, 2d, 29th, and 31st. Local rains occurred in the northern section on the 3d, 9th, 10th, 21st, and 22d; in the middle section on the 3d, 7th, 8th, 10th, 18th, and 19th; and in the southern section on the 8th, 9th, 10th, 18th, 20th, and 28th. In the northern section more than one-half the rainfall for the month occurred on the 31st, and at one station, Fostoria, the entire rainfall for the month occurred on that day. The mean rainfall in the northern section was 2.11; in the middle section, 1.04; in the southern section, 1.01; and for the state 1.50. The rainfall in the northern section was .07 above the average for March. In the middle and southern sections it was 1.48 and 1.53 below the averages for those sections, respectively. The average deficiency for the whole state amounted to 0.87. Thunder-storms were general in the northeastern part of the state on the 31st. Greatest monthly rainfall, 3.19, at Oberlin; least, 0.40, at Jacksonborough. The greatest rainfall in any 24 hours was 2.25, at Oberlin, 31st.

**Wind.**—Prevailing direction, northwest.—*Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Corporal, Signal Corps, assistant.*

## PENNSYLVANIA.

## SUMMARY.

**Temperature.**—The mean temperature for the month, 38.9, is from 2 to 3 above the normal, and 7.8 above that of March, 1888; the mean determined from the daily maximum and minimum temperatures is 39.0. The following stations report the highest average daily temperature: New Castle, 45.3; Selin's Grove, 44.0; Indiana, 43.2; and Pottstown, 43.0. Maximum, 76, at Columbus, 17th; minimum, 4, at Columbus, 11th. The coldest day of the month was the 30th, but the low temperatures that generally occur in March were not reached. The entire month has been characterized by mildness.

**Precipitation.**—The average precipitation, 2.90, is a deficiency of a little over one-half inch; the distribution was uneven. The largest totals reported were: West Chester, 5.44; McConnellsburgh, 4.76; Coatsville, 4.49 and Ottsville, 4.42; several stations report less than 2.00. The greatest monthly snow-fall reported was, 11.50, at Charlesville.

**Wind.**—Prevailing direction, northwest.—*Under direction of the Franklin*

*Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant, in charge.*

## SOUTH CAROLINA.

## SUMMARY.

**Temperature.**—The monthly mean, 51.6, is 0.5 below the mean for March, 1888; highest monthly mean, 57.0, at Timmonsville; lowest monthly mean, 47.0, at Spartanburgh; maximum, 77, at Columbia, 31st; minimum, 20, at Cedar Spring, 11th; range for state, 57.

**Precipitation.**—Average for the state, 3.41; greatest monthly, 7.49, at Charleston; least monthly, 0.30, at Spartanburgh; greatest daily, 3.14, at Charleston, 11th; average number of rainy days, 7.

**Wind.**—Prevailing direction, west.—*Hon. A. P. Butler, Columbia, director; H. C. Seymour, Private, Signal Corps, assistant.*

## TENNESSEE.

The month presented several anomalous features, among which were the small amount of rainfall, the small percentage of cloudiness, and the absence of the usual high winds. Altogether, the month was a very favorable one for the farmer, and the work of planting and preparing for the coming crops was, at the close of the month, much more advanced than usual for the season.

## SUMMARY.

**Temperature.**—The mean temperature, 49.1, is slightly above the normal for the past seven years, and the highest mean during that period; highest monthly mean, 52.8, at McKenzie; lowest monthly mean, 44.3, at Cog Hill; maximum, 82, at Leeville, 14th, and Waynesborough, 18th, and it was the highest maximum recorded in March during the past seven years. Minimum, 16, at Hohenwald, 10th, it being the highest March minimum during the above-mentioned period, except in 1887. The highest temperature throughout the state was recorded on the 17th and 18th, and the lowest, with two or three exceptions, on the 10th. The daily ranges were slightly in excess of the normal. There were two cold-wave warnings received during the month: 15-16th and 27-28th, both of which were verified.

**Precipitation.**—The average precipitation, 3.01, is 1.75 below the March average for the past seven years, and is just half the average for March of last year. Of this amount the eastern division received an average of about 2.50, the middle division about 3.00, and the western division about 3.75; the greater portion fell during the latter half of the month, the 18th and 19th showing the greatest amount. After the rain of the 1st and 2d, which was generally heavy until the 18th, there was a period of almost entire absence of rainfall. A good rain fell on the 24th, 25th, and 31st in the middle and western divisions. The greatest rainfall, 5.33, occurred at Memphis, and the least, 1.50, at McKenzie. A slight fall of snow was reported on the 8th, 9th, 10th, and 28th in the eastern division, but not sufficient to measure.

**Wind.**—Prevailing direction, northwest.—*J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.*

## TEXAS.

## SUMMARY.

**Temperature.**—Monthly mean, 57.2; with the exception of a few places about the normal temperature for March prevailed throughout the state; maximum, 89, at Silver Falls, 29th; minimum, 21, at Fort Elliott, 9th.

**Precipitation.**—The precipitation during the month has been in excess all over the state, the average being 2.93, which is about 1.00 above the normal. There were two rainy periods during the month, one 1st-2d, and the other, 22d-26th; during each of these periods rain fell throughout the greater part of the state. The only excessive precipitation reported was at Mesquite, where 1.80 fell in one hour and fifteen minutes. Monthly rainfall of less than 1.00 was reported from Brenham, Decatur, and El Paso, while at all other points it ranged from 2.00 to 4.00.—*S. O. Young, M. D., Galveston, director; I. M. Cline, Sergeant, Signal Corps, assistant.*

*Meteorological record of Army post surgeons and voluntary observers, March, 1889.*

| Stations.            | Temperature.<br>(Fahrenheit.) |      |      | Precip'n. | Stations.            | Temperature.<br>(Fahrenheit.) |      |      | Precip'n. |
|----------------------|-------------------------------|------|------|-----------|----------------------|-------------------------------|------|------|-----------|
|                      | Max.                          | Min. | Mean |           |                      | Max.                          | Min. | Mean |           |
| <b>Alabama.</b>      |                               |      |      |           | <b>Arizona.</b>      |                               |      |      |           |
| Auburn.....          | 76                            | 30   | 54.7 | 2.81      | Antelope Valley..... | 80                            | 42   | 61.1 | 0.63      |
| Bermuda.....         | 80                            | 31   | 50.1 | 2.09      | Benson.....          | 80                            | 42   | 61.1 | 0.63      |
| Citronelle.....      | 82                            | 36   | 59.5 | 2.79      | Casa Grande.....     | 89                            | 53   | 66.5 | 1.40      |
| Decatur.....         | 82                            | 36   | 59.5 | 2.79      | Cedar Springs.....   | 89                            | 53   | 66.5 | 1.40      |
| Elkmont.....         | 78                            | 28   | 50.5 | 2.95      | Curtis.....          | 84                            | 41   | 60.4 | 2.83      |
| Florence.....        | 76                            | 33   | 50.6 | 2.79      | Florence.....        | 84                            | 41   | 60.4 | 2.83      |
| Gadsden.....         | 78                            | 33   | 51.7 | 3.95      | Fort Apache.....     | 79                            | 25   | 46.5 | 1.75      |
| Greensborough.....   | 82                            | 34   | 55.5 | 1.52      | Fort Bowie.....      | 75                            | 30   | 50.4 | 1.46      |
| Livingston.....      | 80                            | 33   | 55.0 | 2.08      | Fort Huachuca.....   | 85                            | 32   | 51.5 | 2.71      |
| Mt. Vernon B'ks..... | 83                            | 33   | 58.5 | 3.14      | Fort Lowell.....     | 86                            | 35   | 58.5 | 2.46      |
| Mount Willing.....   | 79                            | 33   | 56.7 | 2.65      | Fort McDowell.....   | 87                            | 37   | 59.7 | 1.35      |
| Motest.....          | 80                            | 26   | 53.6 | 4.22      | Fort Mojave.....     | 88                            | 43   | 62.8 | 2.50      |
| New Market.....      | 76                            | 23   | 50.8 | 3.87      | Fort Verde.....      | 80                            | 29   | 51.7 | 0.65      |
| Talladega.....       | 79                            | 28   | 56.0 | 2.97      | Globe.....           | 81                            | 30   | 52.5 | 2.33      |
| Tuscaloosa.....      | 75                            | 26   | 50.3 | 3.12      | Holbrook.....        | 75                            | 26   | 47.8 | 0.82      |
| Tuscumbia.....       | 85                            | 27   | 49.7 | 3.03      | Lochiel.....         | 81                            | 30   | 52.5 | 2.33      |
| Union Springs.....   | 77                            | 34   | 56.0 | 2.18      | Mount Huachuca.....  | 80                            | 34   | 51.3 | 2.61      |
| Uniontown.....       | 81                            | 30   | 58.4 | 2.43      | Pantano.....         | 81                            | 39   | 56.2 | 2.08      |
| Valley Head.....     | 80                            | 20   | 48.0 | 3.50      | Phoenix.....         | 85                            | 40   | 60.1 | 1.00      |
| Wiggins.....         | 83                            | 32   | 54.2 | 3.41      | San Carlos.....      | 85                            | 40   | 60.1 | 1.00      |
| <b>Alaska.</b>       |                               |      |      |           | San Simon.....       | 76                            | 34   | 50.5 | 2.37      |
| Killisnoo.....       | 52                            | 24   | 35.4 | 3.45      | Teviston.....        | 76                            | 34   | 50.5 | 2.37      |
|                      |                               |      |      |           | Tucson (1)k.....     | 81                            | 44   | 63.3 | 1.96      |